CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 19, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vac truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 19, 2014 07:00 to December 20, 2014 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area. AreaRAEs were equipped with sensors to detect Cl_2, VOCs, LEL, H_2S, and SO_2. An additional unit (Unit 06) was deployed in conjunction with work operations near frac tanks as recommended by the onsite safety officer. Units 09 and 10 were deployed in the cabs of excavators supporting solidification operations in the Exclusion Zone. AreaRAE Unit 11 was deployed on Mission Rock Road on the outer fence line of the Santa Clara Waste Water facility primarily to monitor Cl_2 concentrations between the 120 barrel tank truck and the road. Responders investigated LEL readings of 2.4 to 3% on Unit 03 and verified with handheld instruments that no percent LEL was detectable in the area. Unit 10 recorded SO_2 concentrations up to 1.3 ppm, but these readings were also determined to be caused by electronic sensor drift. Unit 11 recorded Cl_2 detections up to 0.6 ppm which were also determined to have been the result of electronic sensor drift. In the case that a drift event was observed and documented, the sensor in question was recalibrated. Unit 09 recorded SO_2 detections ranging from 0.1 to 0.8 ppm between 07:49 and 12:47 on 12/19. Workers were in air-purifying respirators (APR) during this time. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

A particulate monitor was collocated with AreaRAE station 4 and data-logged to monitor PM_{10}. An additional unit was data-logged and placed in the cab with an operator in an excavator supporting solidification operations in the Exclusion Zone. Table 3 summarizes data-logged particulate monitoring data.

All air monitoring operations were halted from approximately 12:00 to 14:30 at the direction of federal agents.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 19, 2014 07:00 – December 20, 2014 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Community	Cl_2	Gastec 8La	6	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	32	0	NA	<1 ppm
	HCl	Gastec 14L	6	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	33	0	NA	<1 %
	O_2	MR+ / MR Pro	33	33	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	6	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	34	34	0.014	0.008 - 0.022 mg/m^3
	SO_2	MR+ / MR Pro	32	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	6	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	34	0	NA	<0.1 ppm
Work Area	Cl_2	Gastec 8La	2	0	NA	<0.05 ppm
		MR+ / MR Pro	15	0	NA	<0.1 ppm
	H_2S	MR+ / MR Pro	8	0	NA	<0.1 ppm
	HCl	Gastec 14L	2	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	15	0	NA	<1 %
	O_2	MR+ / MR Pro	7	7	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	2	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	7	7	0.012	0.01 - 0.015 mg/m^3
	SO_2	MR+ / MR Pro	15	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	2	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	15	0	NA	<0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 19, 2014 07:00 – December 20, 2014 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Unit 01	H_2S	3579	197	0.1 ppm	0.1 - 0.6 ppm
	LEL	3579	0	NA	< 1 %
	SO_2	3579	0	NA	< 0.1 ppm
	VOC	3579	0	NA	< 0.1 ppm
Unit 02	H_2S	3652	15	0.3 ppm	0.1 - 0.8 ppm
	LEL	3652	0	NA	< 1 %
	SO_2	3652	0	NA	< 0.1 ppm
	VOC	3652	52	0.5 ppm	0.1 - 0.9 ppm
Unit 03	H_2S	3252	0	NA	< 1 ppm
	LEL	3252	56	0.028	2.4 - 3.0 %
	SO_2	3252	0	NA	< 0.1 ppm
	VOC	3252	385	0.1 ppm	0.1 - 0.4 ppm
Unit 04	H_2S	2442	0	NA	< 1 ppm
	LEL	2442	0	NA	< 1 %
	SO_2	2442	0	NA	< 0.1 ppm
	VOC	2442	0	NA	< 0.1 ppm
Unit 06	H_2S	625	50	0.1 ppm	0.1 - 0.1 ppm
	LEL	625	0	NA	< 1 %
	SO_2	625	0	NA	< 0.1 ppm
	VOC	625	28	0.1 ppm	0.1 - 0.2 ppm
Unit 09	Cl_2	1171	2	0.1 ppm	0.1 - 0.1 ppm
	LEL	1171	0	NA	< 1 %
	SO_2	1171	187	0.3 ppm	0.1 - 0.9 ppm
	VOC	1171	40	1.2 ppm	0.1 - 1.6 ppm
Unit 10	Cl_2	1056	7	0.1 ppm	0.1 - 0.1 ppm
	LEL	1056	0	NA	< 1 %
	SO_2	1056	395	0.4 ppm	0.1 - 1.3 ppm
	VOC	1056	103	0.1 ppm	0.1 - 0.1 ppm
Unit 11	Cl_2	3590	72	0.2 ppm	0.1 - 0.6 ppm
	LEL	3590	0	NA	< 1 %
	SO_2	3590	0	NA	< 0.1 ppm
	VOC	3590	0	NA	< 0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
December 19, 2014 07:00 – December 20, 2014 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10503020	AR04	1414	1414	0.014	0.005 - 0.128 mg/m^3
10704070	Excavator 210G	90	90	0.007	0.003 - 0.021 mg/m^3
11005015		694	694	0.016	0.004 - 0.104 mg/m^3

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*

Appendix A

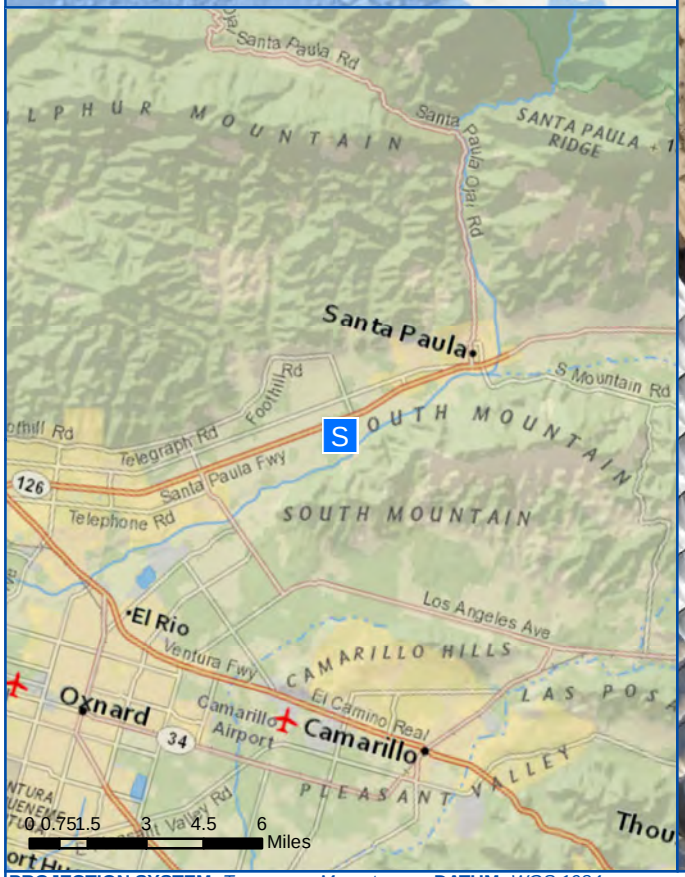
Incident Maps:

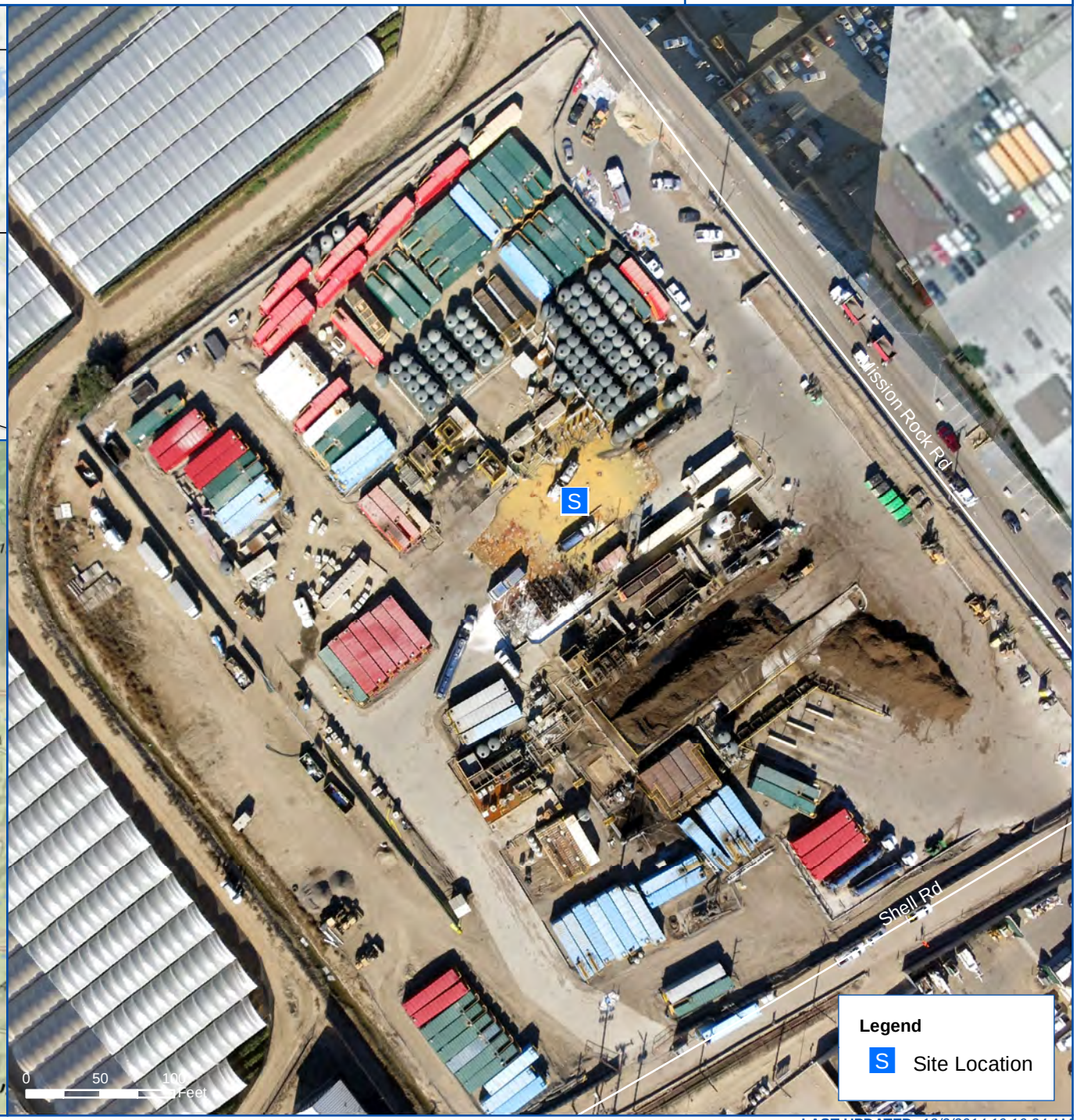
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura





PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Aerial Overview - 12/18/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/19/2014 2:55:38 PM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/20/2014 9:33:06 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/20/2014 9:36:51 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/20/2014 9:37:49 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/20/2014 9:39:04 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/20/2014 9:40:10 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/20/2014 9:41:15 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM_{10} - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/20/2014 9:43:18 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/20/2014 9:45:07 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/20/2014 9:46:25 AM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 19, 2014 07:00 to Dec 20, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/20/2014 9:47:31 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and Location Map

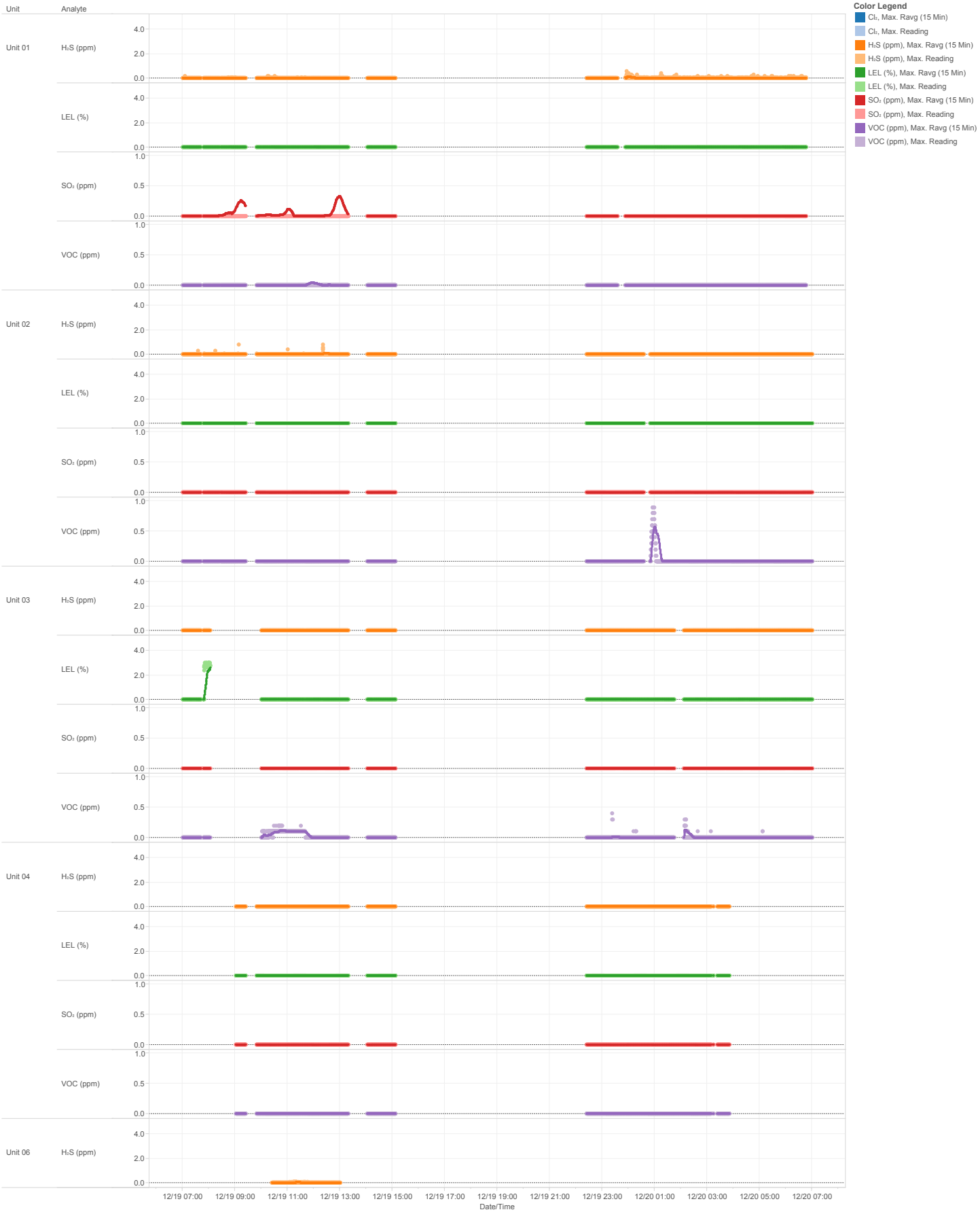
AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

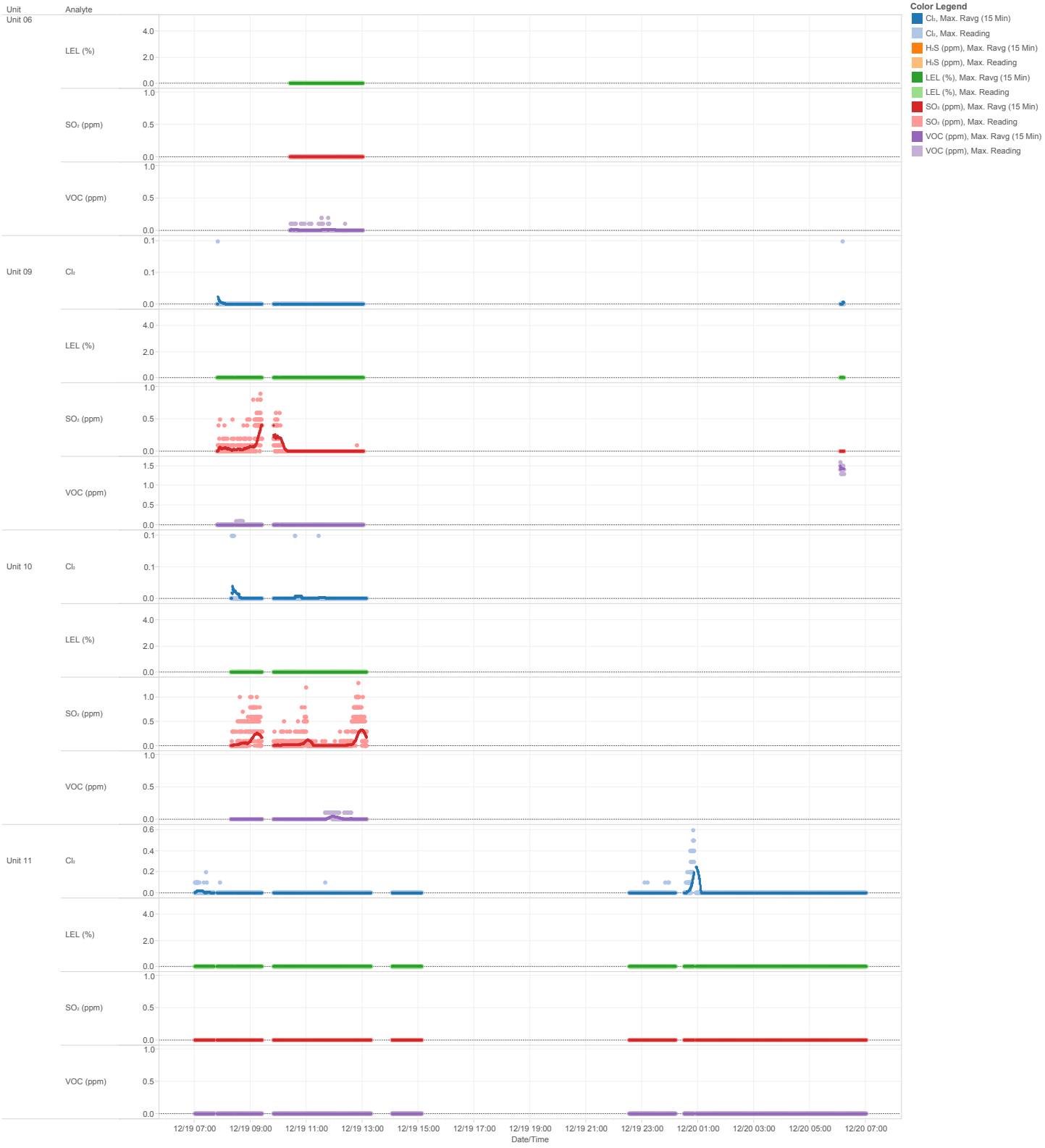
PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/20/2014 12:54:13 PM*

Patriot Environmental
AreaRAE Trend Graphs
12/19/2014 07:00 - 12/20/2014 07:00



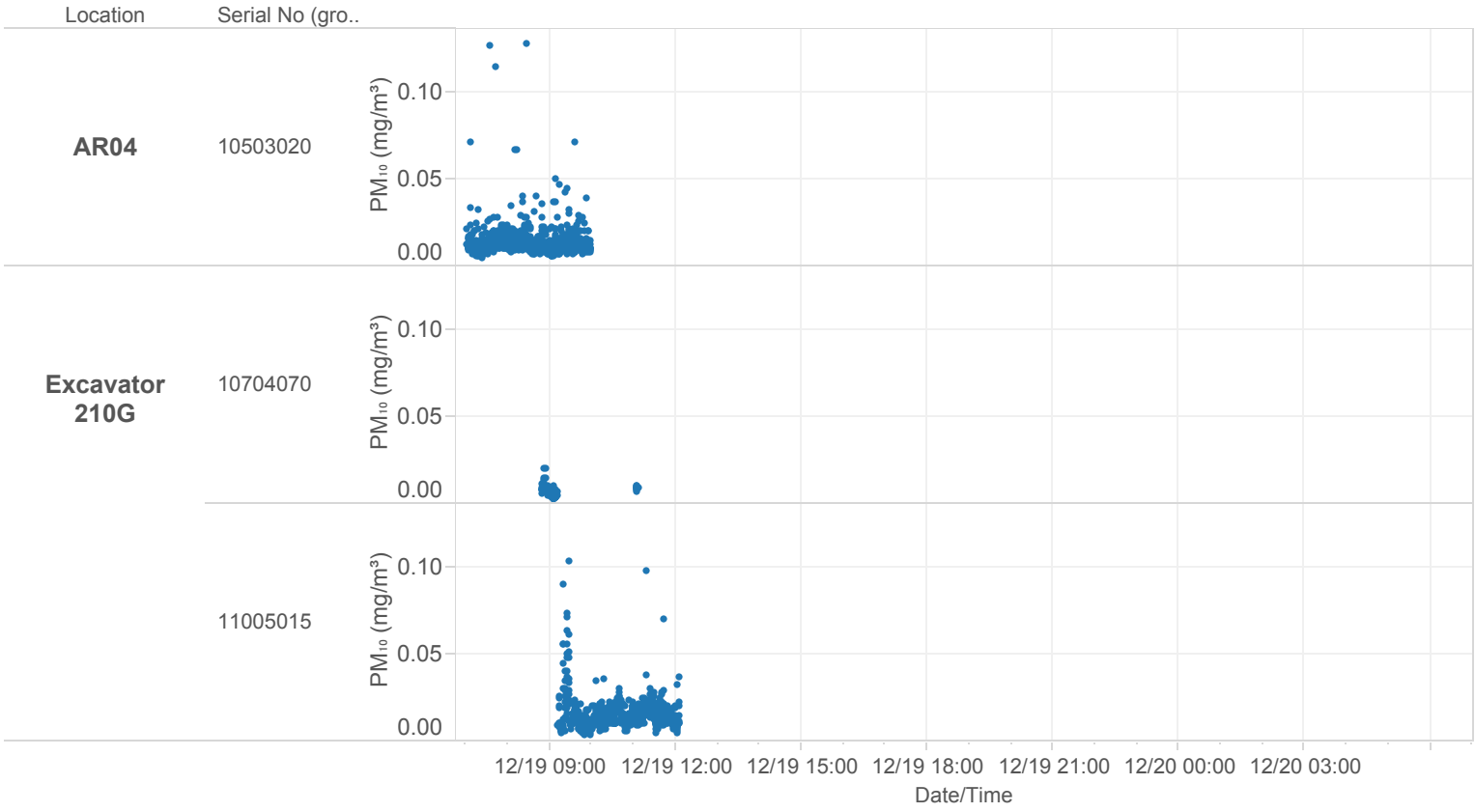
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/19/2014 07:00 - 12/20/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
12/19/2014 07:00 - 12/20/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format